

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Francis BRIAND et al.

Serial No. (unknown)

Filed December 21, 2001

PULSED-ARC WELDING  
PROCESS AND DEVICE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please amend the above-identified application as follows:

IN THE CLAIMS:

Claims 5-13 have been amended as follows:

--5. (amended) Process according to claim 1, characterized in that the wire feed speed ( $V_{\text{wire}}$ ) is between 1 and 20 m/min, preferably between 2 and 15 m/min.--

--6. (amended) Process according to claim 1, characterized in that the pulse frequency is between 20 and 300 Hz, preferably between 50 and 200 Hz.--

--7. (amended) Process according to claim 1, characterized in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.1 and 1.8.--

--8. (amended) Process according to claim 1, characterized in that the workpiece or workpieces to be welded are made of carbon steel and in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.05 and 1.6.--

--9. (amended) Process according to claim 1, characterized in that the workpiece or workpieces to be welded are made of stainless steel and in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.1 and 1.8.--

--10. (amended) Process according to claim 1, characterized in that the workpiece or workpieces to be welded are made of aluminium or aluminium alloy and in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.05 and 1.5.--

--11. (amended) Process according to claim 1, characterized in that the gas shield consists of a gas or

gas mixture chosen from helium, argon, carbon dioxide, oxygen, nitrogen and hydrogen and/or in that the consumable wire has a diameter of between 0.6 mm and 2.2 mm, preferably between 0.8 mm and 1.6 mm.--

--12. (amended) Process according to claim 1, characterized in that the welding is of the pulsed MIG or pulsed MAG type and in that the wire is a solid wire or a flux-cored wire.--

--13. (amended) Pulsed arc welding device, capable of implementing a process according to claim 1, comprising:

- frequency selection means for setting, adjusting or selecting a pulse frequency;
- wire speed selection means for setting, adjusting or selecting a wire feed speed ( $V_{\text{wire}}$ );
- means for determining the mean current ( $I_{\text{mean}}$ ) and rms current ( $I_{\text{rms}}$ ) values making it possible to determine or calculate at least one mean current ( $I_{\text{mean}}$ ) value and at least one rms current ( $I_{\text{rms}}$ ) value such that:

$$I_{\text{mean}} = A_1 V_{\text{wire}} + B_1, \text{ where } 5 < A_1 < 45 \text{ and } 5 < B_1 < 50 \text{ and}$$

$$I_{\text{rms}} = A_2 V_{\text{wire}} + B_2, \text{ where } 5 < A_2 < 45 \text{ and } 45 < B_2 < 110,$$

where  $I_{\text{mean}}$  and  $I_{\text{rms}}$  are expressed in amps and  $V_{\text{wire}}$  is expressed in m/min; and

- current adjustment means for adjusting the welding current in response to the determination or calculation of the mean current ( $I_{\text{mean}}$ ) and rms

current ( $I_{rms}$ ) values by the said means for determining the mean current ( $I_{mean}$ ) and rms current ( $I_{rms}$ ) values;

- preferably it includes or consists of at least one welding current generator.--

R E M A R K S

The above changes in the specification and claims merely place this national phase application in the same condition as it was during Chapter II of the international phase, with the multiple dependencies being removed. Following entry of this amendment by substitution of the pages, only claims remain pending in this application.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

YOUNG & THOMPSON

By



Benoît Castel  
Attorney for Applicants  
Registration No. 35,041  
Customer No. 00466  
745 South 23rd Street  
Arlington, VA 22202  
Telephone: 703/521-2297

December 21, 2001

VERSION WITH MARKINGS TO SHOW CHANGES MADE

Claims 5-13 have been amended as follows:

--5. (amended) Process according to ~~one of Claims 1 to 4~~, claim 1, characterized in that the wire feed speed ( $V_{\text{wire}}$ ) is between 1 and 20 m/min, preferably between 2 and 15 m/min.--

--6. (amended) Process according to ~~one of Claims 1 to 5~~, claim 1, characterized in that the pulse frequency is between 20 and 300 Hz, preferably between 50 and 200 Hz.--

--7. (amended) Process according to ~~one of Claims 1 to 6~~, claim 1, characterized in that the ratio ( $I_{\text{rms}}/I_{\text{mean}}$ ) of the rms current ( $I_{\text{rms}}$ ) value to the mean current ( $I_{\text{mean}}$ ) value is between 1.05 and 2, preferably between 1.1 and 1.8.--

--8. (amended) Process according to ~~one of Claims 1, 2 or 5 to 7~~, claim 1, characterized in that the workpiece or workpieces to be welded are made of carbon steel and in that the ratio ( $I_{\text{rms}}/I_{\text{mean}}$ ) of the rms current ( $I_{\text{rms}}$ ) value to the mean current ( $I_{\text{mean}}$ ) value is between 1.05 and 2, preferably between 1.05 and 1.6.--

--9. (amended) Process according to ~~one of Claims 1, 3 or 5 to 7~~, claim 1, characterized in that the workpiece or workpieces to be welded are made of stainless

steel and in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.1 and 1.8.--

--10. (amended) Process according to ~~one of Claims 1 or 4 to 7~~, claim 1, characterized in that the workpiece or workpieces to be welded are made of aluminium or aluminium alloy and in that the ratio ( $I_{rms}/I_{mean}$ ) of the rms current ( $I_{rms}$ ) value to the mean current ( $I_{mean}$ ) value is between 1.05 and 2, preferably between 1.05 and 1.5.--

--11. (amended) Process according to ~~one of Claims 1 to 10~~, claim 1, characterized in that the gas shield consists of a gas or gas mixture chosen from helium, argon, carbon dioxide, oxygen, nitrogen and hydrogen and/or in that the consumable wire has a diameter of between 0.6 mm and 2.2 mm, preferably between 0.8 mm and 1.6 mm.--

--12. (amended) Process according to ~~one of Claims 1 to 11~~, claim 1, characterized in that the welding is of the pulsed MIG or pulsed MAG type and in that the wire is a solid wire or a flux-cored wire.--

--13. (amended) Pulsed arc welding device, capable of implementing a process according to ~~one of Claims 1 to 12~~, claim 1, comprising:

- frequency selection means for setting, adjusting

or selecting a pulse frequency;

- wire speed selection means for setting, adjusting or selecting a wire feed speed ( $V_{\text{wire}}$ );
- means for determining the mean current ( $I_{\text{mean}}$ ) and rms current ( $I_{\text{rms}}$ ) values making it possible to determine or calculate at least one mean current ( $I_{\text{mean}}$ ) value and at least one rms current ( $I_{\text{rms}}$ ) value such that:  
$$I_{\text{mean}} = A_1 V_{\text{wire}} + B_1, \text{ where } 5 < A_1 < 45 \text{ and } 5 < B_1 < 50 \text{ and}$$
$$I_{\text{rms}} = A_2 V_{\text{wire}} + B_2, \text{ where } 5 < A_2 < 45 \text{ and } 45 < B_2 < 110,$$
where  $I_{\text{mean}}$  and  $I_{\text{rms}}$  are expressed in amps and  $V_{\text{wire}}$  is expressed in m/min; and
- current adjustment means for adjusting the welding current in response to the determination or calculation of the mean current ( $I_{\text{mean}}$ ) and rms current ( $I_{\text{rms}}$ ) values by the said means for determining the mean current ( $I_{\text{mean}}$ ) and rms current ( $I_{\text{rms}}$ ) values;
- preferably it includes or consists of at least one welding current generator.--